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EXAMINER

CHEN, QING

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/796,613	Applicant(s) TAMMA ET AL.	
	Examiner Qing Chen	Art Unit 2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action is in response to the amendment filed on April 28, 2008.
2. **Claims 1-31** are pending.
3. **Claims 1, 3, 4, 10, 13, 14, and 19** have been amended.
4. The 35 U.S.C. § 112, second paragraph, rejections of Claims 3 and 4 are withdrawn in view of Applicant's amendments to the claims.

Response to Amendment

Claim Objections

5. **Claims 1-14, 16, 18, and 19** are objected to because of the following informalities:
 - **Claim 1** recites the limitation "the scripts" corresponding to both the data definition language scripts and the data manipulation language scripts. Applicant is advised to change this limitation to read "the first set of data definition language (DDL) scripts" and "the second set of data manipulation language scripts," respectively, for the purpose of providing it with proper explicit antecedent basis.
 - **Claims 2-12** depend on Claim 1 and, therefore, suffer the same deficiency as Claim 1.
 - **Claims 3 and 4** contain a typographical error: "[T]he particular version version" should read -- the particular version --.
 - **Claim 10** recites the limitation "the union by set theory." Applicant is advised to change this limitation to read "the set theory union" for the purpose of providing it with proper explicit antecedent basis.

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- **Claims 11, 13, 14, 16, 18, and 19** contain a typographical error: The set theory union symbol (U) should be added into the set theory formula notations.
- **Claims 13, 14, and 19** recite the limitation “a/the union by set theory.” Applicant is advised to change this limitation to read “a/the set theory union” for the purpose of keeping the claim language consistent throughout the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1-6, 8, 10-20, and 23-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over **US 6,970,876 (hereinafter “Hotti”)** in view of **US 6,415,299 (hereinafter “Baisley”)** and **“Set Theory,” July 2002 (hereinafter “Set_Theory”)**.

As per **Claim 1**, Hotti discloses:

- automatically determining a first set of data definition language (DDL) scripts associated with implementing the particular version of the relational database, wherein the first set of data definition language (DDL) scripts are selected from a plurality of scripts, one or more of the plurality of scripts being not associated with implementing the particular version (*see*

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Column 2: 9-10, "'Schema script' is a script that creates a schema or creates a new revision of an existing schema of a database node."; Column 3: 21-25, "These synchronized schema/application configuration management replicas comprise scripts that are used for creating and/or updating the schemas of the database nodes and managing the configurations of applications that use the database node."; Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."; Column 7: 51-54, "The application master schema is updated by running the scripts of the new revision, 506. The scripts are found from the configuration management replica database of the server."); and

- automatically determining a second set of data manipulation language scripts associated with implementing the particular version of the relational database, wherein the second set of data manipulation language scripts are selected from a plurality of scripts, one or more of the plurality of scripts being not associated with implementing the particular version (*see Column 2: 9-10, "'Schema script' is a script that creates a schema or creates a new revision of an existing schema of a database node."; Column 3: 21-25, "These synchronized schema/application configuration management replicas comprise scripts that are used for creating and/or updating the schemas of the database nodes and managing the configurations of applications that use the database node."; Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."; Column 7: 51-54, "The application master schema is updated by running the scripts of the new revision, 506. The scripts are found from the configuration management replica database of the server."*).

However, Hotti does not disclose:

- generating an installation file comprising a set theory union of the first set and the second set.

Baisley discloses:

- generating an installation file comprising a union of the first set and the second set
(see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include generating an installation file comprising a union of the first set and the second set. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database *(see Baisley – Column 1: 21-24)*.

Set Theory discloses:

- a set theory union *(see Section 1, “For example, a set C is the union of two sets A and B if its members are exactly those objects that are either members of A or members of B.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Set Theory into the teaching of Hotti to include a set theory union. The modification would be obvious because one of ordinary skill in

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the art would be motivated to apply the principles of set theory involving membership relation to produce a set of schema scripts (*see Set Theory – Section 1*).

As per **Claim 2**, the rejection of **Claim 1** is incorporated; and Hotti further discloses:

- wherein the particular version is associated with a first version in a sequence of one or more versions of the relational database (*see Column 2: 7-8, ““Schema revision” is a snapshot version of a schema that is identifiable by logical name or version number.”*).

As per **Claim 3**, the rejection of **Claim 1** is incorporated; and Hotti further discloses:

- wherein the automatically determining a first set comprises extracting a filename from metadata associated with the particular version, the filename associated with a file comprising a data definition language script (*see Column 6: 18-21, “The configuration management node 231 includes a configuration management application 234 for managing the schemas and application configuration of the database system.” and 53-55, “In step 302 the database schema is defined using configuration management application and stored to the schema management master database, step 303.” and 63-66, “As part of the registration, the identification data, e.g. schema name, of the new application database node is sent to the configuration management master database node.”*).

As per **Claim 4**, the rejection of **Claim 1** is incorporated; and Hotti further discloses:

- wherein the automatically determining a second set comprises extracting a filename from metadata associated with the particular version, the filename associated with a file

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comprising a data manipulation language script (*see Column 6: 18-21, "The configuration management node 231 includes a configuration management application 234 for managing the schemas and application configuration of the database system."* and 53-55, "In step 302 the database schema is defined using configuration management application and stored to the schema management master database, step 303." and 63-66, "As part of the registration, the identification data, e.g. schema name, of the new application database node is sent to the configuration management master database node.").

As per **Claim 5**, the rejection of **Claim 1** is incorporated; however, Hotti and Set_Theory do not disclose:

- wherein the generating an installation file comprises copying a data definition language script from a script file associated with the first set into the installation file.

Baisley discloses:

- wherein the generating an installation file comprises copying a data definition language script from a script file associated with the first set into the installation file (*see Column 2: 14-19, "The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include wherein the generating an installation file comprises copying a data definition language script

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from a script file associated with the first set into the installation file. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 6**, the rejection of **Claim 1** is incorporated; however, Hotti and Set Theory do not disclose:

- wherein the generating an installation file comprises copying a data manipulation language script from a script file associated with the second set into the installation file.

Baisley discloses:

- wherein the generating an installation file comprises copying a data manipulation language script from a script file associated with the second set into the installation file (*see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include wherein the generating an installation file comprises copying a data manipulation language script from a script file associated with the second set into the installation file. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 8**, the rejection of **Claim 1** is incorporated; and Hotti further discloses:

- wherein metadata exists that describes a sequence of multiple versions of the relational database where each version is an upgrade from a previous version, and the particular version is not a first version in the sequence (*see Column 2: 14 and 15, "Schema script publication" is a system publication that contains the schema scripts of the database hierarchy.*; *Column 6: 18-21, "The configuration management node 231 includes a configuration management application 234 for managing the schemas and application configuration of the database system."*).

As per **Claim 10**, the rejection of **Claim 8** is incorporated; however, Hotti does not disclose:

- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data definition language script associated with the first version;
- iteratively extracting a set A_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ; and
- determining the first set as the set theory union of sets A_1, A_2, \dots, A_j .

Baisley discloses:

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- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data definition language script associated with the first version (*see Figure 3; Column 5: 17-36, "We start with a first model version 30 (or V1) where an attribute $A.X=0$ of the model."*);

- iteratively extracting a set A_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $i-1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j (*see Figure 3; Column 5: 17-36, "In the next model version 31 (or V2) the attribute $A.X$ is still equal to zero. However in a new branch, model version 32 (or V2A) $A.X$ is now set equal to 2 ($A.X=2$). Likewise, in model version 33 (or V2B) $A.X$ is still equal to two."*); and

- determining the first set as the union of sets A_1, A_2, \dots, A_j (*see Column 2: 14-19, "The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data definition language script associated with the first version;

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- iteratively extracting a set A_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ; and
- determining the first set as the union of sets A_1, A_2, \dots, A_j .

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

Set Theory discloses:

- a set theory union (*see Section 1, “For example, a set C is the union of two sets A and B if its members are exactly those objects that are either members of A or members of B .”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Set Theory into the teaching of Hotti to include a set theory union. The modification would be obvious because one of ordinary skill in the art would be motivated to apply the principles of set theory involving membership relation to produce a set of schema scripts (*see Set Theory – Section 1*).

As per **Claim 11**, the rejection of **Claim 8** is incorporated; however, Hotti and Set Theory do not disclose:

- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data manipulation language (DML) script associated with the first version;

- iteratively extracting a set A_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a DML script to be executed to add or modify a DML object when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ;

- iteratively extracting a set B_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a DML drop script to be executed to drop a DML object when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ; and

- determining the second set C_j by determining:

$$\begin{aligned} C_2 &= [A_1 \cup A_2] - B_2, \\ C_3 &= [C_2 \cup A_3] - B_3, \\ C_4 &= [C_3 \cup A_4] - B_4, \\ &\dots \\ C_j &= [C_{j-1} \cup A_j] - B_j. \end{aligned}$$

Baisley discloses:

- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data

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manipulation language (DML) script associated with the first version (see Figure 3; Column 5:

17-36, “We start with a first model version 30 (or V1) where an attribute $A.X=0$ of the model.”);

- iteratively extracting a set A_i comprising zero or more filenames from metadata

associated with an i^{th} version of the relational database, the zero or more filenames each

associated with a file comprising a DML script to be executed to add or modify a DML object

when upgrading from version $i-1$ of the relational database to version i of the relational

database, where i varies incrementally from 2 to j , where the particular version is j (see

Figure 3; Column 5: 17-36, “In the next model version 31 (or V2) the attribute $A.X$ is still equal

to zero. However in a new branch, model version 32 (or V2A) $A.X$ is now set equal to 2 ($A.X=2$).

Likewise, in model version 33 (or V2B) $A.X$ is still equal to two.”);

- iteratively extracting a set B_i comprising zero or more filenames from metadata

associated with an i^{th} version of the relational database, the zero or more filenames each

associated with a file comprising a script to be executed when upgrading from version $i-1$ of

the relational database to version i of the relational database, where i varies incrementally from

2 to j , where the particular version is j (see Figure 3; Column 5: 17-36, “In the next model

version 31 (or V2) the attribute $A.X$ is still equal to zero. However in a new branch, model

version 32 (or V2A) $A.X$ is now set equal to 2 ($A.X=2$). Likewise, in model version 33 (or V2B)

$A.X$ is still equal to two.”); and

- determining the second set C_j by determining:

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$$\begin{aligned}
C_2 &= [A_1 \cup A_2] - B_2, \\
C_3 &= [C_2 \cup A_3] - B_3, \\
C_4 &= [C_3 \cup A_4] - B_4, \\
&\dots \\
C_j &= [C_{j-1} \cup A_j] - B_j
\end{aligned}$$

(see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).

Official Notice is taken that it is old and well-known within the computing art to include a drop script as part of the DML. A query language often provides a “drop” command to remove a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a drop script. The modification would be obvious because one of ordinary skill in the art would be motivated to remove a database object.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- extracting a set A_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data manipulation language (DML) script associated with the first version;
- iteratively extracting a set A_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a DML script to be executed to add or modify a DML object

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when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ;

- iteratively extracting a set B_i comprising zero or more filenames from metadata associated with an i^{th} version of the relational database, the zero or more filenames each associated with a file comprising a DML drop script to be executed to drop a DML object when upgrading from version $i - 1$ of the relational database to version i of the relational database, where i varies incrementally from 2 to j , where the particular version is j ; and

- determining the second set C_j by determining:

$$\begin{aligned} C_2 &= [A_1 \cup A_2] - B_2, \\ C_3 &= [C_2 \cup A_3] - B_3, \\ C_4 &= [C_3 \cup A_4] - B_4, \\ &\dots \\ C_j &= [C_{j-1} \cup A_j] - B_j. \end{aligned}$$

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 12**, the rejection of **Claim 1** is incorporated; and Hotti further discloses:

- One or more computer-readable media having computer-readable instructions recorded thereon which, when executed by a computer, cause the computer to implement the method as recited in claim 1 (*see Column 5: 1-5, “The invention also relates to a storage media comprising a stored, readable computer program, which is characterized in that the program*

comprises instructions for controlling a data management system or components thereof to implement the method according to the invention.”).

As per **Claim 13**, Hotti discloses:

- determining a set *A* of data definition language (DDL) scripts that, when executed, resulting in DDL objects associated with version *j* of the relational database (*see Column 2: 9-10, “"Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”; Column 7: 51-54, “The application master schema is updated by running the scripts of the new revision, 506. The scripts are found from the configuration management replica database of the server.”*);
- determining a set *B* of data manipulation language (DML) scripts that, when executed, create DML objects that are associated with version *j* of the relational database, but that are not associated with version *i* of the relational database (*see Column 2: 9-10, “"Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”; Column 7: 51-54, “The application master schema is updated by running the scripts of the new revision, 506. The scripts are found from the configuration management replica database of the server.”*).

However, Hotti does not disclose:

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- perform creates, alters, and drops of DDL objects associated with version i of the relational database;
- determining a set C of DML scripts that, when executed, modify DML objects that are associated with both version i and version j of the relational database, but that differ between version i and version j of the relational database;
- determining a set D of DML drop scripts that, when executed, drop DML objects that are associated with version i of the relational database, but that are not associated with version j of the relational database; and
- generating an upgrade file comprising a set theory union of sets A , B , C , and D ($A \cup B \cup C \cup D$).

Official Notice is taken that it is old and well-known within the computing art to include create, alter, and drop commands in a DDL/DML script. A query language often provides these basic commands to manipulate a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include create, alter, and drop commands in a DDL/DML script. The modification would be obvious because one of ordinary skill in the art would be motivated to manipulate a database object.

Baisley discloses:

- determining a set C of DML scripts that, when executed, modify DML objects that are associated with both version i and version j of the relational database, but that differ between version i and version j of the relational database (*see Column 5: 38-45, "It is possible that a conflict may result if the same object or association is modified in both lines of development. Note that there is a conflict between model versions 33 and 34 where the attribute*

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A.X=2 in model version 33 and A.X=1 in model version 34. The merge method of the present invention allows the user to specify if they want to keep the target value (version 34, A.X=1) or the source value (version 33, A.X=2).”); and

- generating an upgrade file comprising a union of sets A , B , C , and D

($A \cup B \cup C \cup D$) (see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- determining a set C of DML scripts that, when executed, modify DML objects that are associated with both version i and version j of the relational database, but that differ between version i and version j of the relational database; and

- generating an upgrade file comprising a union of sets A , B , C , and D

($A \cup B \cup C \cup D$).

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (see Baisley – Column 1: 21-24).

Set Theory discloses:

- a set theory union (see Section 1, “For example, a set C is the union of two sets A and B if its members are exactly those objects that are either members of A or members of B .”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Set Theory into the teaching of Hotti to include a set theory union. The modification would be obvious because one of ordinary skill in the art would be motivated to apply the principles of set theory involving membership relation to produce a set of schema scripts (*see Set Theory – Section 1*).

As per **Claim 14**, the rejection of **Claim 13** is incorporated; however, Hotti does not disclose:

- iteratively extracting sets M_k , each comprising zero or more filenames from metadata associated with a k^{th} version of the relational database, where $i < k \leq j$, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $k-1$ of the relational database to version k of the relational database; and

- determining the set A as the set theory union of sets $M_{i+1}, M_{i+2}, \dots, M_j$
 $(A = M_{i+1} \cup M_{i+2} \cup \dots \cup M_j)$.

Baisley discloses:

- iteratively extracting sets M_k , each comprising zero or more filenames from metadata associated with a k^{th} version of the relational database, where $i < k \leq j$, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $k-1$ of the relational database to version k of the relational database (*see Figure 3; Column 5: 17-36, "In the next model version 31 (or V2) the*

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attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two.”); and

- determining the set A as the union of sets $M_{i+1}, M_{i+2}, \dots, M_j$

($A = M_{i+1} \cup M_{i+2} \cup \dots \cup M_j$) (see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- iteratively extracting sets M_k , each comprising zero or more filenames from metadata associated with a k^{th} version of the relational database, where $i < k \leq j$, the zero or more filenames each associated with a file comprising a data definition language script to be executed when upgrading from version $k-1$ of the relational database to version k of the relational database; and

- determining the set A as the union of sets $M_{i+1}, M_{i+2}, \dots, M_j$

($A = M_{i+1} \cup M_{i+2} \cup \dots \cup M_j$).

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (see Baisley – Column 1: 21-24).

Set Theory discloses:

- a set theory union (*see Section 1, “For example, a set C is the union of two sets A and B if its members are exactly those objects that are either members of A or members of B .”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Set_Theory into the teaching of Hotti to include a set theory union. The modification would be obvious because one of ordinary skill in the art would be motivated to apply the principles of set theory involving membership relation to produce a set of schema scripts (*see Set_Theory – Section 1*).

As per **Claim 15**, the rejection of **Claim 13** is incorporated; however, Hotti and Set_Theory do not disclose:

- determining a set E of DML scripts that when executed:
 - perform alters of DML objects associated with version i and version j of the relational database, but that differ between version i and version j of the relational database; and
 - perform creates of DML objects that are associated with version j of the relational database but that are not associated with version i of the relational database; and
- determining set B as the difference between sets E and C ($B = E - C$).

Official Notice is taken that it is old and well-known within the computing art to perform alters and creates of DML objects. A query language often provides “create” and “alter” commands to create and modify, respectively, a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include

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performing alters and creates of DML objects. The modification would be obvious because one of ordinary skill in the art would be motivated to create and/or modify a database object.

Baisley discloses:

- determining set B as the difference between sets E and C ($B = E - C$) (see *Column 5: 47-67, "TABLE I below illustrates the conflict resolution, which may be made between versions 33 and 34."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- determining set B as the difference between sets E and C ($B = E - C$).

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (see Baisley – *Column 1: 21-24*).

As per **Claim 16**, the rejection of **Claim 15** is incorporated; however, Hotti and Set Theory do not disclose:

- iteratively determining a set P_x of DML scripts that when executed will upgrade DML objects from version $x-1$ of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j ;
- iteratively determining a set N_x of DML scripts that when executed will drop DML objects that are associated with version $x-1$ of the relational database but that are not associated with version x of the relational database, where x varies incrementally from $i+2$ to j ;

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- iteratively determining a set M_x of DML scripts that when executed will upgrade DML objects from version i of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j , and where:

$$\begin{aligned} M_{i+1} &= P_{i+1} \\ M_{i+2} &= [M_{i+1} \cup P_{i+2}] - N_{i+2} \\ M_{i+3} &= [M_{i+2} \cup P_{i+3}] - N_{i+3} \\ &\dots \\ M_j &= [M_{j-1} \cup P_j] - N_j; \text{ and} \end{aligned}$$

- determining set $E = M_j$.

Baisley discloses:

- iteratively determining a set P_x of DML scripts that when executed will upgrade DML objects from version $x-1$ of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j (see Figure 3; Column 5: 17-36, "In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two.");

- iteratively determining a set N_x of DML scripts that are associated with version $x-1$ of the relational database but that are not associated with version x of the relational database, where x varies incrementally from $i+2$ to j (see Figure 3; Column 5: 17-36, "In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two.");

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- iteratively determining a set M_x of DML scripts that when executed will upgrade DML objects from version i of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j , and where:

$$\begin{aligned}
 M_{i+1} &= P_{i+1} \\
 M_{i+2} &= [M_{i+1} \cup P_{i+2}] - N_{i+2} \\
 M_{i+3} &= [M_{i+2} \cup P_{i+3}] - N_{i+3} \\
 &\dots \\
 M_j &= [M_{j-1} \cup P_j] - N_j
 \end{aligned}$$

(see Figure 3; Column 5: 17-36, “In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two.”); and

- determining set $E = M_j$ (see Figure 3; Column 5: 17-36, “In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two.”).

Official Notice is taken that it is old and well-known within the computing art to include a drop script as part of the DML. A query language often provides a “drop” command to remove a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a drop script. The modification would be obvious because one of ordinary skill in the art would be motivated to remove a database object.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

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- iteratively determining a set P_x of DML scripts that when executed will upgrade DML objects from version $x-1$ of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j ;
- iteratively determining a set N_x of DML scripts that when executed will drop DML objects that are associated with version $x-1$ of the relational database but that are not associated with version x of the relational database, where x varies incrementally from $i+2$ to j ;
- iteratively determining a set M_x of DML scripts that when executed will upgrade DML objects from version i of the relational database to version x of the relational database, where x varies incrementally from $i+1$ to j , and where:

$$\begin{aligned}
 M_{i+1} &= P_{i+1} \\
 M_{i+2} &= [M_{i+1} \cup P_{i+2}] - N_{i+2} \\
 M_{i+3} &= [M_{i+2} \cup P_{i+3}] - N_{i+3} \\
 &\dots \\
 M_j &= [M_{j-1} \cup P_j] - N_j; \text{ and}
 \end{aligned}$$

- determining set $E = M_j$.

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 17**, the rejection of **Claim 13** is incorporated; and Hotti further discloses:

- determining a set F_j of DML scripts that when executed, create DML objects associated with version j of the relational database (*see Column 2: 9-10, "Schema script" is a*

script that creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”).

However, Hotti and Set Theory do not disclose:

- determining a set E of DML scripts that when executed:
 - perform alters of DML objects associated with version i and version j of the relational database, but that differ between version i and version j of the relational database; and
 - perform creates of DML objects that are associated with version j of the relational database but that are not associated with version i of the relational database; and
- determining set C as the intersection of set E and set F_j ($C = E \cap F_j$).

Official Notice is taken that it is old and well-known within the computing art to perform alters and creates of DML objects. A query language often provides “create” and “alter” commands to create and modify, respectively, a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include performing alters and creates of DML objects. The modification would be obvious because one of ordinary skill in the art would be motivated to create and/or modify a database object.

Baisley discloses:

- determining set C as the intersection of set E and set F_j ($C = E \cap F_j$) (see Column 5: 47-67, “TABLE I below illustrates the conflict resolution, which may be made between versions 33 and 34.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- determining set C as the intersection of set E and set F_j ($C = E \cap F_j$).

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 18**, the rejection of **Claim 17** is incorporated; however, Hotti and Set Theory do not disclose:

- extracting a set M_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data manipulation language (DML) script associated with the first version;
- iteratively extracting a set M_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file comprising a DML script to be executed to add or modify a DML object when upgrading from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j ;
- iteratively extracting a set B_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file comprising a DML drop script to be executed to drop a DML object when upgrading

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from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j ; and

- determining the set F_j by determining:

$$F_2 = [M_1 \cup M_2] - B_2,$$

$$F_3 = [F_2 \cup M_3] - B_3,$$

$$F_4 = [F_3 \cup M_4] - B_4,$$

...

$$F_j = [F_{j-1} \cup M_j] - B_j.$$

Baisley discloses:

- extracting a set M_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data manipulation language (DML) script associated with the first version (*see Figure 3; Column 5: 17-36, "We start with a first model version 30 (or V1) where an attribute A.X=0 of the model."*);
- iteratively extracting a set M_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file comprising a DML script to be executed to add or modify a DML object when upgrading from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j (*see Figure 3; Column 5: 17-36, "In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two."*);

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- iteratively extracting a set B_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file when upgrading from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j (see Figure 3; Column 5: 17-36, “In the next model version 31 (or V2) the attribute $A.X$ is still equal to zero. However in a new branch, model version 32 (or V2A) $A.X$ is now set equal to 2 ($A.X=2$). Likewise, in model version 33 (or V2B) $A.X$ is still equal to two.”); and

- determining the set F_j by determining:

$$F_2 = [M_1 \cup M_2] - B_2,$$

$$F_3 = [F_2 \cup M_3] - B_3,$$

$$F_4 = [F_3 \cup M_4] - B_4,$$

...

$$F_j = [F_{j-1} \cup M_j] - B_j$$

(see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).

Official Notice is taken that it is old and well-known within the computing art to include a drop script as part of the DML. A query language often provides a “drop” command to remove a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a drop script. The modification would be obvious because one of ordinary skill in the art would be motivated to remove a database object.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

- extracting a set M_1 comprising one or more filenames from metadata associated with a first version in the sequence, the one or more filenames associated with a file comprising a data manipulation language (DML) script associated with the first version;

- iteratively extracting a set M_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file comprising a DML script to be executed to add or modify a DML object when upgrading from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j ;

- iteratively extracting a set B_x comprising zero or more filenames from metadata associated with version x of the relational database, the zero or more filenames each associated with a file comprising a DML drop script to be executed to drop a DML object when upgrading from version $x - 1$ of the relational database to version x of the relational database, where x varies incrementally from 2 to j ; and

- determining the set F_j by determining:

$$F_2 = [M_1 \cup M_2] - B_2,$$

$$F_3 = [F_2 \cup M_3] - B_3,$$

$$F_4 = [F_3 \cup M_4] - B_4,$$

...

$$F_j = [F_{j-1} \cup M_j] - B_j.$$

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 19**, the rejection of **Claim 13** is incorporated; however, Hotti does not disclose:

- determining a set E of DML scripts that when executed:
 - perform alters of DML objects associated with version i and version j of the relational database, but that differ between version i and version j of the relational database; and
 - perform creates of DML objects that are associated with version j of the relational database but that are not associated with version i of the relational database;
 - iteratively determining a set F_x of DML scripts that when executed, drop DML objects associated with version $x - 1$ of the relational database that are not associated with version x of the relational database, where x varies incrementally from $i + 1$ to j ;
 - determining a set G as the set theory union of sets $F_i, F_{i+1}, F_{i+2}, \dots, F_j$ ($G = F_i \cup F_{i+1} \cup \dots \cup F_{i+2}$); and
 - determining set D as the difference between set G and set E ($D = G - E$).

Official Notice is taken that it is old and well-known within the computing art to perform alters and creates of DML objects. A query language often provides “create” and “alter” commands to create and modify, respectively, a database object. Therefore, it would have been

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obvious to one of ordinary skill in the art at the time the invention was made to include performing alters and creates of DML objects. The modification would be obvious because one of ordinary skill in the art would be motivated to create and/or modify a database object.

Baisley discloses:

- iteratively determining a set F_x of DML scripts that when executed, drop DML objects associated with version $x - 1$ of the relational database that are not associated with version x of the relational database, where x varies incrementally from $i + 1$ to j (see Figure 3; Column 5: 17-36, *"In the next model version 31 (or V2) the attribute A.X is still equal to zero. However in a new branch, model version 32 (or V2A) A.X is now set equal to 2 (A.X=2). Likewise, in model version 33 (or V2B) A.X is still equal to two."*);

- determining a set G as the union of sets $F_i, F_{i+1}, F_{i+2}, \dots, F_j$ ($G = F_i \cup F_{i+1} \cup \dots \cup F_{i+2}$) (see Column 2: 14-19, *"The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists."*); and

- determining set D as the difference between set G and set E ($D = G - E$) (see Column 5: 47-67, *"TABLE I below illustrates the conflict resolution, which may be made between versions 33 and 34."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include:

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- iteratively determining a set F_x of DML scripts that when executed, drop DML objects associated with version $x - 1$ of the relational database that are not associated with version x of the relational database, where x varies incrementally from $i + 1$ to j ;

- determining a set G as the union of sets $F_i, F_{i+1}, F_{i+2}, \dots, F_j$

$(G = F_i \cup F_{i+1} \cup \dots \cup F_{i+2})$; and

- determining set D as the difference between set G and set E ($D = G - E$).

The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

Set Theory discloses:

- a set theory union (*see Section 1, “For example, a set C is the union of two sets A and B if its members are exactly those objects that are either members of A or members of B .”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Set Theory into the teaching of Hotti to include a set theory union. The modification would be obvious because one of ordinary skill in the art would be motivated to apply the principles of set theory involving membership relation to produce a set of schema scripts (*see Set Theory – Section 1*).

As per **Claim 20**, Hotti discloses:

- a processor (*see Column 3: 66 and 67, “A database system may include server computers, smart terminals, other terminals and network nodes.”*);

- a memory (*see Column 3: 66 and 67, "A database system may include server computers, smart terminals, other terminals and network nodes."*);
- one or more data definition language (DDL) scripts, each associated with one or more versions of a relational database (*see Column 2: 9-10, "'Schema script' is a script that creates a schema or creates a new revision of an existing schema of a database node."; Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."*);
- one or more data manipulation language (DML) scripts, each associated with one or more versions of the relational database (*see Column 2: 9-10, "'Schema script' is a script that creates a schema or creates a new revision of an existing schema of a database node."; Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."*);
- a database schema version management structure definition (*see Column 1: 39-43, "'Database Schema' is the structure of a database system, described in a formal language supported by the database management system (DBMS). In a relational database, the schema defines the tables, the fields in each table, and the relationships between fields and tables."; Column 2: 7-8, "'Schema revision' is a snapshot version of a schema that is identifiable by logical name or version number." and 14-15, "'Schema script publication' is a system publication that contains the schema scripts of the database hierarchy."*); and
- schema data associated with multiple versions of the relational database, the schema data organized according to the database schema version management structure definition (*see Column 2: 14 and 15, "'Schema script publication' is a system publication that contains the*

schema scripts of the database hierarchy.”; Column 6: 18-21, “The configuration management node 231 includes a configuration management application 234 for managing the schemas and application configuration of the database system.”).

However, Hotti does not disclose:

- an installation file generator stored in the memory and executed on the processor to apply laws of set theory to the schema data to generate a file comprising the one or more DDL scripts associated with a particular one of the multiple versions of the relational database, and the one or more DML scripts associated with the particular one of the multiple versions of the relational database.

Baisley discloses:

- an installation file generator stored in the memory and executed on the processor to apply laws of set theory to the schema data to generate a file comprising the one or more DDL scripts associated with a particular one of the multiple versions of the relational database, and the one or more DML scripts associated with the particular one of the multiple versions of the relational database (*see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include an installation file generator stored in the memory and executed on the processor to apply laws of set theory to the schema data to generate a file comprising the one or more DDL scripts

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associated with a particular one of the multiple versions of the relational database, and the one or more DML scripts associated with the particular one of the multiple versions of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 23**, Hotti discloses:

- a memory (*see Column 3: 66 and 67, “A database system may include server computers, smart terminals, other terminals and network nodes.”*);
- a processor (*see Column 3: 66 and 67, “A database system may include server computers, smart terminals, other terminals and network nodes.”*); and
- a database schema version management system stored in the memory, and executed on the processor to:
 - manage schema data associated with multiple versions of a relational database (*see Figure 2a: 234; Column 2: 7-8, ““Schema revision” is a snapshot version of a schema that is identifiable by logical name or version number.”*; Column 6: 17-20, “The configuration management node 231 includes a configuration management application 234 for managing the schemas and application configuration of the database system.”).

However, Hotti does not disclose:

- generate an installation file associated with any one of the multiple versions of the relational database.

Baisley discloses:

- generating an installation file comprising a union of the first set and the second set
(see Column 2: 14-19, "The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include generate an installation file associated with any one of the multiple versions of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database *(see Baisley – Column 1: 21-24)*.

As per **Claim 24**, the rejection of **Claim 23** is incorporated; and Hotti further discloses:

- wherein the schema data identifies a script associated with a data definition language object of the relational database *(see Column 2: 9-10, "'Schema script' is a script that creates a schema or creates a new revision of an existing schema of a database node."; Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.").*

As per **Claim 25**, the rejection of **Claim 23** is incorporated; and Hotti further discloses:

- wherein the schema data identifies a script associated with a data manipulation language object of the relational database *(see Column 2: 9-10, "'Schema script' is a script that*

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creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”).

As per **Claim 26**, the rejection of **Claim 23** is incorporated; however, Hotti does not disclose:

- wherein the database schema version management system is further configured to generate an installation file associated with an initial version of the relational database.

Baisley discloses:

- wherein the database schema version management system is further configured to generate an installation file associated with an initial version of the relational database (*see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include wherein the database schema version management system is further configured to generate an installation file associated with an initial version of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 27**, the rejection of **Claim 23** is incorporated; however, Hotti does not disclose:

- wherein the database schema version management system is further configured to generate an installation file associated with a non-initial version of the relational database.

Baisley discloses:

- wherein the database schema version management system is further configured to generate an installation file associated with a non-initial version of the relational database (*see Column 2: 14-19, "The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include wherein the database schema version management system is further configured to generate an installation file associated with a non-initial version of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 28**, the rejection of **Claim 23** is incorporated; however, Hotti does not disclose:

- wherein the database schema version management system is further configured to generate an upgrade file for upgrading one version of the relational database to another version of the relational database.

Baisley discloses:

- wherein the database schema version management system is further configured to generate an upgrade file for upgrading one version of the relational database to another version of the relational database (*see Column 2: 14-19, "The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include wherein the database schema version management system is further configured to generate an upgrade file for upgrading one version of the relational database to another version of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 29**, Hotti discloses:

- maintain schema data that identifies scripts associated with database objects of multiple sequential versions of a relational database (*see Column 2: 9-10, "Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database*

node.” and 14-15, ““Schema script publication” is a system publication that contains the schema scripts of the database hierarchy.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”).

However, Hotti does not disclose:

- generate an installation file associated with an initial version of the relational database by applying laws of set theory to the schema data to identify scripts associated with the database objects of the initial version of the relational database.

Baisley discloses:

- generate an installation file associated with an initial version of the relational database by applying laws of set theory to the schema data to identify scripts associated with the database objects of the initial version of the relational database (*see Column 2: 14-19, “The method comprises the steps of building a first list as a collection of versions that occur only in a history of the source version; and, building a second list as a collection of versions that occur only in a history of the target version. Next, a dual history is created as a union of the first and second lists.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Baisley into the teaching of Hotti to include generate an installation file associated with an initial version of the relational database by applying laws of set theory to the schema data to identify scripts associated with the database objects of the initial version of the relational database. The modification would be obvious

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because one of ordinary skill in the art would be motivated to define, track, and maintain objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

As per **Claim 30**, the rejection of **Claim 29** is incorporated; and Hotti further discloses:

- generate an installation file associated with a non-initial version of the relational database by applying laws of set theory to the schema data to identify:
 - scripts associated with data definition language (DDL) objects that are associated with the non-initial version of the relational database (*see Column 2: 9-10, “Schema script is a script that creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”*); and
 - scripts associated with data manipulation language (DML) objects that are associated with the non-initial version of the relational database (*see Column 2: 9-10, “Schema script is a script that creates a schema or creates a new revision of an existing schema of a database node.”; Column 4: 49-58, “Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.”*).

As per **Claim 31**, the rejection of **Claim 29** is incorporated; and Hotti further discloses:

- generate an upgrade file associated with an upgrade from a first, but not necessarily initial, version of the relational database to a second, later, but not necessarily immediately

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sequential, version of the relational database by applying laws of set theory to the schema data to identify:

- data definition language (DDL) scripts associated with DDL objects of the relational database that have been created or modified between the first and second versions of the relational database (*see Column 2: 9-10, "Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.*"; Column 4: 49-58, *"Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."*);
- data manipulation language (DML) scripts associated with DML objects of the relational database that have been created between the first and second versions of the relational database (*see Column 2: 9-10, "Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.*"; Column 4: 49-58, *"Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."*); and
- DML scripts associated with DML objects of the relational database that have been modified between the first and second versions of the relational database (*see Column 2: 9-10, "Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.*"; Column 4: 49-58, *"Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts."*).

However, Hotti does not disclose:

- drop scripts associated with database objects that have been dropped and not re-created between the first and second versions of the relational database.

Official Notice is taken that it is old and well-known within the computing art to include a drop script as part of the DML. A query language often provides a “drop” command to remove a database object. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include drop scripts associated with database objects that have been dropped and not re-created between the first and second versions of the relational database. The modification would be obvious because one of ordinary skill in the art would be motivated to remove a database object.

8. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hotti** in view of **Baisley** and **Set_Theory** as applied to Claim 6 above, and further in view of “**Oracle8i Distributed Database Systems Release 8.1.5,” February 1999 (hereinafter “Oracle1999”)**.

As per **Claim 7**, the rejection of **Claim 6** is incorporated; however, Hotti, Baisley, and Set_Theory do not disclose:

- wherein the copying further comprises prepending a create command to the data manipulation language script in the installation file.

Oracle1999 discloses:

- wherein the copying further comprises prepending a create command to the data manipulation language script in the installation file (*see Page 2-13*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Oracle1999 into the teaching of Hotti to include wherein the copying further comprises prepending a create command to the data manipulation language script in the installation file. The modification would be obvious because one of ordinary skill in the art would be motivated to define a stored procedure.

9. **Claims 9, 21, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hotti** in view of **Baisley** and **Set_Theory** as applied to Claims 8 and 20 above, and further in view of **US 6,947,945 (hereinafter “Carey”)**.

As per **Claim 9**, the rejection of **Claim 8** is incorporated; however, Hotti, Baisley, and Set_Theory do not disclose:

- wherein the metadata comprises an XML file.

Carey discloses:

- wherein the metadata comprises an XML file (*see Column 1: 30-32, “An alternative data format to the tables found in an RDBMS is XML, which is a tag language for describing documents.”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Carey into the teaching of Hotti to include wherein the metadata comprises an XML file. The modification would be obvious because one of ordinary skill in the art would be motivated to utilize a future standard for information

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exchange between peer data stores, and between client visualization tools and data servers (*see Carey – Column 2: 15-17*).

As per **Claim 21**, the rejection of **Claim 20** is incorporated; however, Hotti, Baisley, and Set Theory do not disclose:

- wherein the database schema version management structure definition comprises an XML schema definition.

Carey discloses:

- wherein the database schema version management structure definition comprises an XML schema definition (*see Column 1: 44-49, “XML schemas specify constraints on the structures and types of elements in an XML document.” and “Other XML schema definitions are also being developed, such as XML Schema ...”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Carey into the teaching of Hotti to include wherein the database schema version management structure definition comprises an XML schema definition. The modification would be obvious because one of ordinary skill in the art would be motivated to specify constraints on the structures and types of elements in an XML document (*see Carey – Column 2: 44-49*).

As per **Claim 22**, the rejection of **Claim 21** is incorporated; however, Hotti, Baisley, and Set Theory do not disclose:

- wherein the schema data is maintained in an XML file structured according to the XML schema definition.

Carey discloses:

- wherein the schema data is maintained in an XML file structured according to the XML schema definition (*see Column 1: 30-32, "An alternative data format to the tables found in an RDBMS is XML, which is a tag language for describing documents."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Carey into the teaching of Hotti to include wherein the schema data is maintained in an XML file structured according to the XML schema definition. The modification would be obvious because one of ordinary skill in the art would be motivated to utilize a future standard for information exchange between peer data stores, and between client visualization tools and data servers (*see Carey – Column 2: 15-17*).

Response to Arguments

10. Applicant's arguments with respect to Claims 1, 13, 20, 23, and 29 have been considered but are moot in view of the new ground(s) of rejection.

In the Remarks, Applicant argues:

a) The Examiner indicates (Action, p. 4) that, in the same passage (col. 2 line 14), Baisley discloses the "generating of an installation file." Applicant respectfully disagrees. Baisley discloses the combining of two program source code files into a new single program source code file that is the result of the merging of the original two. Applicant claims the creation of an

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"installation file" made up of multiple installation scripts. Baisley's merged source code file is a merging of text into a single text file. The claimed installation file is a collection of independent scripts combined into a single executable framework. These two concepts cannot be equated. Therefore, Baisley does not disclose "generating an installation file" as recited by claims 1, 13, 20, 23, and 29.

Examiner's response:

a) Examiner disagrees. Applicant's arguments are not persuasive for at least the following reasons:

First, in response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Second, Baisley is relied upon by the Examiner for its specific teaching of "a union of the first set and the second set." Hotti clearly discloses the first set of data definition language (DDL) scripts and the second set of data manipulation language (DML) scripts (*see Column 2: 9-10, "Schema script" is a script that creates a schema or creates a new revision of an existing schema of a database node.*"; *Column 4: 49-58, "Schema scripts can also include DML (Data Manipulation Language) or DDL (Data Definition Language) scripts, or any other data manipulation scripts.*"). One of ordinary skill in the art would understand that the DDL and DML scripts are essentially installation files themselves. When the DDL and DML scripts are executed, the database schema associated with the scripts is installed in the database. The

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claimed feature of an “installation file” is merely a consolidation of the determined DDL and DML scripts into a single script file. Thus, one of ordinary skill in the art would be motivated to incorporate the teaching of Baisley into the teaching of Hotti to combine the DDL and DML scripts into a single script file. Such modification would offer improvements in defining, tracking, and maintaining objects, models, and versions in a database (*see Baisley – Column 1: 21-24*).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to Applicant’s disclosure.

12. Applicant’s amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Qing Chen whose telephone number is 571-270-1071. The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 4:00 PM. The Examiner can also be reached on alternate Fridays.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wei Zhen, can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/QC/
July 23, 2008

/Wei Zhen/

Supervisory Patent Examiner, Art Unit 2191